

# PATENT ABSTRACTS OF JAPAN

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## (54) UTILIZATION PROMOTER FOR INTERNAL DEPOT FAT

### (57)Abstract:

PROBLEM TO BE SOLVED: To provide a utilization promoter for internal depot fat which, being digested, can promote the utilization of an internal depot fat at such a time to require an energy as a sporting time or the like and can supply actively the required energy.

SOLUTION: This utilization promoter for internal depot fat comprises glycerides composed of 50 wt.% or more of diglycerides among the whole glycerides.

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DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the use accelerator of the accumulation-in-body fat which promotes the operation which uses a fat in the living body as an energy source at the time of movement.

[0002]

[Description of the Prior Art] Conventionally, many health drinks, especially the drink aiming at the energy supply at the time of a sport are developed. For example, there is ENERUGEN (Otsuka Pharmaceutical) etc. and it aims at the energy supply at the time of endurance exercise. Energy required for movement is mainly supplied from the sugar and the fat which are stored in the inside of the body. Between these two energy sources, sugar is used for short-time rapid movement, and a fat is used for tenacity-movement. In a sport, it is important to maintain tenacity on an effective target using the fat held inside of the body.

[0003] By the way, the body of a fat important as an energy source is a triglyceride, and or it was taken in, the triglyceride accumulated in the inside of the body is metabolized by the citric acid cycle through acetyl CoA, after being decomposed into a fatty acid. If the balance of this fatty-acid metabolic turnover and fat intake is good, it will be thought that a fat is not superfluously accumulated in the inside of the body, and the energy at the time of movement does not run short.

[0004] On the other hand, the ketone body is the generic name of an acetoacetic acid, beta-hydroxybutyric acid, and an acetone. these groups -- although a compound generates acetyl CoA by the beta oxidation of a fatty acid mainly by liver, when the availability of sugar in the living body of the time of acetyl CoA from a fatty acid becoming an excessive amount, a fast, diabetes mellitus, etc. falls, it increases. Also when it is not especially at the symptoms time, and TCA cycle falls in the saccharometabolism, it is known that the ketone body will increase. The generated ketone body is used also as an energy source in the heart or skeletal muscle at the time of the need for energy. Therefore, the matter which has the operation which makes the ketone body in blood increase at the time of the need for energy promotes use of the fat accumulated in the inside of the body, and is considered to be useful as a component of a health drink.

[0005]

[Problem(s) to be Solved by the Invention] Therefore, the purpose of this invention is to offer the use accelerator of the accumulation-in-body fat which promotes use of a fat in the living body at the time of the need for energy.

[0006]

[Means for Solving the Problem] Then, this invention persons came to complete a header and this invention for having the operation which promotes use of the fat which diglyceride is accumulating in the inside of the body [ unexpectedly / a triglyceride ] at the time of required movement of energy, as a result of examining many things about the relation between intake of a fat, and the amount of ketone-body elimination in urine.

[0007] That is, this invention offers the use accelerator of the accumulation-in-body fat it is fatless from the glyceride whose 50 % of the weight or more in [ all ] a glyceride is diglyceride.

[0008] As for the diglyceride used for this invention, i.e., the glycerol diester of a fatty acid, it is desirable that it is diester of the fatty acid of the saturation of the carbon atomic numbers 6-22 (especially carbon atomic numbers 14-22) or partial saturation and a glycerol. As an example of the saturated fatty acid of the carbon atomic numbers 6-22, a lauric acid, a myristic acid, a palmitic acid, stearin acid, arachin acid, and behenic acid can be mentioned. As an example of the unsaturated fatty acid of the carbon atomic numbers 6-22, palmitoleic acid, oleic acid, an elaidic acid, an iso oleic acid, a petroselinic acid, an erucic acid, linolic acid, and the Reno Laing acid can be mentioned.

[0009] As for the diglyceride used for this invention, it is desirable to have fatty acid composition with many unsaturated fatty acid components. That is, it is desirable for an unsaturated fatty acid radical to occupy 70% of the weight or more of a total-fatty-acid radical at this invention, and, as for diglyceride, it is desirable that it is especially 80 % of the weight or more. And it is desirable for the great portion of diglyceride to be a JI unsaturated fatty acid glyceride. In addition, although diglyceride may be independently used in this invention, since it is not easy on industry, you may use isolating only diglyceride as mixture with a monoglyceride or a triglyceride. However, it is required for 50 % of the weight or more in [ all ] a glyceride to be diglyceride in that case.

[0010] The diglyceride preferably used in this invention for example, fats and oils (an example and safflower oil --) with many contents of an unsaturated fatty acid radical Olive oil, cotton seed oil, corn oil, oleum rapae, soybean oil, palm oil, sunflower oil, Sesame oil; Lard, beef tallow, fish oil, milk fat or those judgment oils, a randomization oil, A kind or two sorts or more of the fats and oils and the glycerols which were chosen from hardened oil and an ester interchange oil An ester interchange can be carried out under existence of the hydroxide of alkali metal or alkaline earth metal, or it can obtain by the esterification reaction of a fatty-acid mixture and a glycerol with the high unsaturated fatty acid content of these fats-and-oils origins. The superfluous monoglyceride generated at the reaction is removable using separation means, such as a molecular distillation method or a chromatography. In addition, although these reactions can be carried out also by the chemical reaction which used the above alkali catalysts etc., the flavor of the diglyceride obtained of the direction where at least 1 and 3- reacts on mild conditions using enzymes, such as alternative lipase, is good, and it is desirable.

[0011] The diglyceride used by this invention can be obtained also by judgment of natural edible oil and fat.

[0012] The oral acute toxicity in the rat of such diglycerides is more than 10 g/kg weight, and is high. [ of safety ]

[0013] The use accelerator of the accumulation-in-body fat of this invention is added and used for a health drink etc. Although especially the loadings to a health drink are not restricted, its 0.01 % of the weight or more is desirable as diglyceride, its 0.01 - 30 % of the weight is more desirable, and especially its 1 - 10 % of the weight is desirable.

[0014] Although organic acids, such as minerals, such as sweeteners, such as the component which can be blended with the usual soft drinks in addition to diglyceride, for example, sugar, fruit sugar, grape sugar, and liquid sugar, salt, potassium chloride, and a magnesium chloride, vitamins, a citric acid, a malic acid, and a tartaric acid, amino acid, etc. can be blended with the health drink which added the use accelerator of the depot fat of this invention in the living body, it is not limited to this.

[0015]

[Example] Next, although an example is given and this invention is explained further, this invention is not limited to this.

[0016] The diglyceride used in each following example is manufactured by the following approach. 860g of oleum rapae origin fatty acids and glycerol 140g which has the fatty acid composition of Table 1 were made to react at 40 degrees C by making into a catalyst commercial lipase pharmaceutical preparation (NOBOINDASUTORI A. S company make and trade name: Lypozyme 3A) at least immobilization 1 and whose 3- are alternative lipase. After carrying out lipase pharmaceutical preparation after a reaction a \*\* exception, the resultant was covered over molecular distillation, it

[0017]

脂肪酸 名 称	脂肪酸組成
C16:0 パルミチン酸	3～4
C16:1 パルミトレイン酸	痕跡
C18:0 ステアリン酸	1～2
C18:1 オレイン酸	約60
C18:2 リノール酸	約20
C18:3 リノレン酸	9～13
C20:0 アラキン酸	痕跡
C20:1 ゴンドイン酸	2～3
C22:0 ベヘン酸	痕跡
C22:1 エルカ酸	<5

[0020]

Figure 1 is a timeline diagram showing the sequence of events for the study. The timeline starts at '初日' (Day 0) and goes to '七日目' (Day 7). Key events are marked: '採尿' (urine collection) at Day 6, and '採血 1' (blood collection 1) at Day 5, '採血 2' (blood collection 2) at Day 6, and '採血 尿粉' (blood and urine powder collection) at Day 7.

[0021] (2) Moreover, comparison examination was performed also about the model of the usual energy use condition which does not have the case where the load of the movement is carried out, and movement, as a model of a high energy use condition. In addition, the movement load carried out the load of the forced movement using the treadmill (made in the Natsume factory) to the schedule of Table 3.

[0022]

[http://www4.ipdl.ncipi.go.jp/cgi-bin/tran\\_web/cgi\\_ejje](http://www4.ipdl.ncipi.go.jp/cgi-bin/tran_web/cgi_ejje)



## 運動条件

- ・運動：1日2回・角度 5度
- ・時間：30分間
- ・速度：20m/min

[0023] The feed presentation used for a diet is as in Table 4.

[0024]

[Table 4]

組成 (%)	ジグリセリド食群	トリグリセリド食群
脂肪	ジグリセリド21.0* <sup>3</sup>	トリグリセリド20.0
カゼイン	20.0	20.0
セルロース	3.5	3.5
ミネラル* <sup>1</sup>	4.0	4.0
ビタミン* <sup>2</sup>	1.0	1.0
$\beta$ -シトステロール	0.112	—
$\alpha$ -ポテトスターチ	50.388	51.5

[0025] \*1 \*2:AIN86 combination \*3 : It could be 21.0% in order to unite the amount of fatty acids with a triglyceride.

[0026] In addition, measurement of the inside of blood and the ketone-body concentration in urine is clinician vol.9, the special number numbers 1811-1814, and KURINIKA. KIMIKA According to the approach of a publication, it carried out to AKUTA (Clinica ChimicaAct) and 134; 327-336.

[0027] B. A test-result result is shown in Table 5 - 8.

[0028]

[Table 5]

体重変化及び臓器重量

	ジグリセリド投与	トリグリセリド投与
<u>運動負荷群</u>		
初期体重(g)	180.50±3.99	180.76±4.08
最終体重(g)	218.32±7.49	222.70±8.97
増加量(g)	37.82±4.18	41.94±9.81
肝臓重量(g)	9.61±0.27	9.82±0.77
腎臓重量(g)	1.69±0.15	1.77±0.11
脾臓重量(g)	0.61±0.06	0.63±0.04
<u>非運動群</u>		
初期体重(g)	182.37±2.58	181.63±3.65
最終体重(g)	251.35±3.57	252.20±7.14
増加量(g)	68.98±4.22	70.57±5.46
肝臓重量(g)	11.49±0.58	11.94±0.53
腎臓重量(g)	1.97±0.09	1.95±0.05
脾臓重量(g)	0.70±0.06	0.72±0.06

[0029] Although weight and each organ weight showed the low value from Table 5 as compared with non-motion group in the movement load group, the difference was not accepted in a diglyceride administration group and triglyceride administration between groups.

[0030]

[Table 6]

摂食量

総摂食量(g/week)	ジグリセリド投与	トリグリセリド投与
運動負荷群	101.38±7.13	106.03±6.47
非運動群	129.46±7.39	137.76±6.74

[0031] Although food consumption showed the low value from Table 6 as compared with non-motion group in the movement load group, the diglyceride administration group and the difference triglyceride administration between groups were not accepted.

[0032]

[Table 7]

運動による血清ケトン体濃度の変化

血清ケトン体量	ジグリセリド投与	トリグリセリド投与
(mmol/L)		
<u>5日目</u>		
運動前	1.28±0.13	1.13±0.16
運動後	2.40±0.55	2.15±0.82
<u>6日目</u>		
運動前	1.65±0.71	1.56±0.62
運動後	3.18±0.46	3.57±0.46

[0033] Although the amount of ketone bodies in blood increased from Table 7 by exercising, the

diglyceride administration group and the difference triglyceride administration between groups were not accepted.

[0034]

[Table 8]

屠殺時血清ケトン体濃度及び尿中ケトン体濃度

	ジグリセリド投与	トリグリセリド投与
運動負荷群		
血清ケトン体濃度 (mmol/L)	0.92±0.15	1.01±0.15
尿中ケトン体濃度 (mmol/day/weight)	4.72±0.47*	5.09±0.78
非運動群		
血清ケトン体濃度 (mmol/L)	1.02±0.20	1.06±0.16
尿中ケトン体濃度 (mmol/day/weight)	8.40±1.37*	6.60±0.75

\*:p<0.01

[0035] From Table 8, the amount of ketone bodies in blood was not accepted for the difference by each between groups one in a movement load group and non-motion group. On the other hand, by the movement load group, as for the amount of ketone bodies in urine, the diglyceride administration group showed the low value intentionally as compared with the triglyceride administration group. Moreover, by non-motion group, the diglyceride administration group showed the high price intentionally as compared with the triglyceride administration group.

[0036] In the rat which does not carry out a movement load, although the difference was not accepted in the amount of ketone bodies in blood by Table 5 - 8, from it, the amount of ketone-body elimination to the inside of urine showed the high price by diglyceride foods. This shows that diglyceride changed a diet or the fatty acid of the body fat origin into the ketone body, excreted into urine, and has controlled body are recording of a fat. In the rat which carried out the load of the movement, the ketone body in urine showed the low value by the diglyceride group as compared with the triglyceride group. On the other hand, the ketone body in blood went up after movement [ diet group / a diglyceride diet group and / triglyceride / movement before ], and the difference was not accepted for the value by both the diet group. This also uses the ketone body generated from diglyceride as an energy source, and is considered that ketone-body elimination into urine fell at the same time diglyceride uses a fat in the living body as an energy source at the time of movement. That is, diglyceride has controlled the are recording to the inside of the body using the fatty acid to the inside of the body at the time of movement.

[0037] Example 2 [0038]

(Table 9)

Health drink presentation Citric acid 50mg Vitamin B1 5mg Vitamin B2 5mg Vitamin B6 5mg Vitamin C 20mg Caffeine 50mg Grape sugar 10g Fruit sugar 3g Sodium chloride 50mg Potassium chloride



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CLAIMS

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[Claim(s)]

[Claim 1] The use accelerator of the accumulation-in-body fat it is fatless from the glyceride whose 50 % of the weight or more in [ all ] a glyceride is diglyceride.

[Claim 2] The use accelerator of the accumulation-in-body fat according to claim 1 whose content of diglyceride is 0.01 % of the weight or more.

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TECHNICAL FIELD

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[Field of the Invention] This invention relates to the use accelerator of the accumulation-in-body fat which promotes the operation which uses a fat in the living body as an energy source at the time of movement.

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PRIOR ART

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[Description of the Prior Art] Conventionally, many health drinks, especially the drink aiming at the energy supply at the time of a sport are developed. For example, there is ENERUGEN (Otsuka Pharmaceutical) etc. and it aims at the energy supply at the time of endurance exercise. Energy required for movement is mainly supplied from the sugar and the fat which are stored in the inside of the body. Between these two energy sources, sugar is used for short-time rapid movement, and a fat is used for tenacity-movement. In a sport, it is important to maintain tenacity on an effective target using the fat held inside of the body.

[0003] By the way, the body of a fat important as an energy source is a triglyceride, and or it was taken in, the triglyceride accumulated in the inside of the body is metabolized by the citric acid cycle through acetyl CoA, after being decomposed into a fatty acid. If the balance of this fatty-acid metabolic turnover and fat intake is good, it will be thought that a fat is not superfluously accumulated in the inside of the body, and the energy at the time of movement does not run short.

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EFFECT OF THE INVENTION

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[Effect of the Invention] If the use accelerator of the depot fat of this invention in the living body is taken in, at the time of the energy need at the time of a sport etc., use of the fat accumulated in the inside of the body can be promoted, and required energy can be supplied positively.

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TECHNICAL PROBLEM

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[Problem(s) to be Solved by the Invention] Therefore, the purpose of this invention is to offer the use accelerator of the accumulation-in-body fat which promotes use of a fat in the living body at the time of the need for energy.

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[Translation done.]